January 14, 2020

Administrator Andrew Wheeler
Office of the Administrator, Mail Code 1101A
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Dear Administrator Wheeler:

We are environmental health scientists and health professionals with expertise on the impacts of toxic chemicals, including pesticides, on fetal and childhood development. We write to you because we are concerned about the U.S. Environmental Protection Agency (EPA) continuing to permit the widespread use of neonicotinoid insecticides.

Neonicotinoids, or "neonics," were once considered practically non-toxic to humans and other mammals, but new research indicates that they may have a wide range of physiological effects. Because these effects are potentially serious, poorly understood, and could ultimately impact millions of Americans, we urge EPA to limit the use of neonics – particularly for uses where pregnant women and children could be exposed, including farmworkers and their families.

As initial steps, we recommend that EPA:

- cancel seed treatment uses immediately, since they contribute significantly to water and soil contamination without providing significant crop yields to farmers;
- include the 10X safety factor as required by the Food Quality Protection Act (FQPA) to protect sensitive populations including pregnant women, infants, and children; and
- address the cumulative impacts of all neonics as a group, as required by the FQPA.

EPA should also take any additional warranted actions to protect human health as they become apparent from the agency's review of the emerging science. Independently, EPA must also take any needed steps to safeguard pollinator and ecosystem health from unreasonable adverse environmental impacts as required by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). *See* 7 U.S.C. § 136a (a), (d), (g).

A discussion of the relevant science and our recommendations is provided below.

Exposure to neonics via food and water contamination

People around the world are commonly exposed to neonics. One study of the U.S. population from 2015-2016 found evidence that roughly half of people over three years old had been recently exposed. Young children showed the highest exposure concentrations,[1] possibly because they eat more food per pound of body weight.[2] In another study, researchers in Japan detected toxic metabolites of acetamiprid, a neonic, in newborn children, suggesting that pregnant mothers transfer neonics and their metabolites to the fetus.[3] Because of the widespread nature of neonic exposure, any negative health effects are cause for serious concern.

One common route of exposure to neonics is food – with neonics often found in common items such as apples, cherries, honey, strawberries, and baby food.[4] One survey found neonics in 80% of spinach and 73% of applesauce samples nationwide.[5] Because of the systemic properties of neonics, they are not removed by washing or peeling.

Another exposure route – and one of growing concern – is drinking water. A survey of 25 states and territories by the U.S. Geological Survey (USGS) detected neonics in over half of the streams tested, suggesting widespread surface water contamination.[6] USGS testing results reported frequently detecting imidacloprid in urban and suburban surface waters. This contamination was linked to non-agricultural uses of imidacloprid, commonly used on lawns and landscaping.[7] Independent research has also found contamination of surface water and drinking water in heavily agricultural regions.[8]

Conventional drinking water treatment systems are largely ineffective in removing neonics.[9] Multiple studies have documented neonic contamination of tap water.[10] Worse still, emerging research suggests that chlorination during routine drinking water treatment could result in the creation of new, potentially toxic, compounds.[11]

Acute poisoning incident data

Non-agricultural uses of neonics have led to poisonings of people, including, but not limited to, the following adverse effects according to incident poisoning reports received from EPA through a Freedom of Information Act Request:[12]

- Clothianidin – numbness, chest pain, headache, muscle weakness and tremors, shortness of breath, sore throat, coughing, skin rash and itching, tachycardia (rapid heart rate), blurred vision, and abdominal pain;
- Imidacloprid – rash, muscle tremor, difficulty breathing, vomiting, wheezing, lock jaw, memory loss, and renal failure; and
- Thiamethoxam – throat irritation, skin irritation and rash, fever, numbness, dizziness, diarrhea, and sweating (and note that the major metabolite of thiamethoxam is clothianidin).

These reports, which are consistent with the clinical signs and symptoms of poisoning from a neurotoxic agent, confirm that these products used in the real-world are poisoning people.

Chronic toxicity concerns

A recent systematic review of publicly-available literature on unintentional human exposures to neonics (such as from agricultural uses or consumer products) reported a link between those exposures and elevated risk of developmental or neurological damage. Effects linked to neonic exposures include malformations of the developing heart and brain, autism spectrum disorder, and a cluster of symptoms including memory loss and finger tremors.[13] While the authors note that the studies to date have limitations, they warn that, "[g]iven the widespread use of neonicotinoids in agriculture and household products and its increasing detection in U.S. food and water, more studies on the human health effects of chronic (non-acute) neonicotinoids exposure are needed."[14]

Wildlife studies also report neurotoxic effects, including developmental abnormalities. A recent study of white-tailed deer experimentally exposed to environmentally-relevant levels of imidacloprid in their water (0, 1.5, 3.0, 15 micrograms/L) exhibited hypothyroidism and lethargy, decreased body and organ

weight, decreased jawbone length, and higher mortality rates for fawns.[15] This study also found levels of neonics in wild white-tailed deer that were higher than the experimental levels in the captive population, demonstrating contamination in foraging wildlife.

Laboratory studies also support a link between neonic exposures and adverse systemic effects, including on the neurological, reproductive, and immune systems.[16]

The concordance of effects – particularly to the nervous system in adults and during early life development – across a wide range of exposure levels, study types, and biological systems raises a red flag about the human toxicity of neonic insecticides.

Neurotoxic chemicals may be considered unsafe for pregnant women, infants, and children

A 2008 scientific consensus statement by environmental health and medical experts as well as researchers of neurotoxic chemicals warns that:

> The brain is particularly sensitive to toxic exposures during development, which involves a complex series of steps that must be completed in the right sequence and at the right time. Slight decrements in brain function may have serious implications for future social functioning and economic activities, even in the absence of mental retardation or obvious disease. Each neurotoxic contaminant may perhaps cause only a negligible effect, but the combination of several toxic chemicals, along with other adverse factors, such as poor nutrition, may trigger substantial decrements in brain function.[17]

In other words, we cannot continue to keep giving a free pass to neurotoxic chemicals on the supposition that a little bit of a bad thing is not so bad.

In 2016, a collaboration of medical professionals and scientists from across the U.S. came together to develop a consensus statement and call to action to reduce exposures to neurotoxic chemicals.[18] Pesticides in our air, water, food, and soil were included because they can increase the risk of permanent and debilitating disorders including autism, learning disabilities, and cognitive impairments. The experts recognized pregnant women as needing added protections and raised concern about exposures during critical windows of brain development that can cause lasting harm. They specifically flagged the problem of cumulative exposures to even low or presumed safe levels of many chemicals at once. The statement says:

> Our failures to protect children from harm underscore the urgent need for a better approach to developing and assessing scientific evidence and using it to make decisions. As a society, we should be able to take protective action when scientific evidence indicates a chemical is of concern, and not wait for unequivocal proof that a chemical is causing harm to our children.
>
> Evidence of neurodevelopmental toxicity of any type – epidemiological or toxicological or mechanistic – by itself should constitute a signal sufficient to trigger prioritization and some level of action. Such an approach would enable policy makers and regulators to proactively test and identify chemicals that are

emerging concerns for brain development and prevent widespread human exposures.

When exposures take place during the critical periods of brain and nervous system development, it is unclear whether any exposure is truly without deleterious effects. It is for that reason that the National Academies issued its landmark report, Pesticides in the Diets of Infants and Children (1993),[19] which led Congress to unanimously pass the FQPA in 1996.[20] The FQPA represented the scientific consensus that pregnant women, infants, and children deserve special attention because of their unique vulnerabilities to pesticides generally and neurotoxic pesticides specifically.

Seed treatments should be cancelled

Neonic seed treatments – which account for over 90 percent of neonics in agriculture – are largely ineffective and lead to significant pollution.[21] Typically, about 1 to 10 percent (and often no more than 2 percent) of the neonic treatment enters the target plant, leaving the remainder to contaminate soil, water, and nearby plants.[22] Scientists with the USGS have documented neonics in the streams and waterways of areas with high corn and soybean production as a result of seed treatment uses.[23]

EPA concluded in a 2014 report "that these seed treatments provide little or no overall benefits to soybean production in most situations. Published data indicate that in most cases there is no difference in soybean yield when soybean seed was treated with neonicotinoids versus not receiving any insect control treatment."[24] Similar reports are emerging on the ineffectiveness of corn seed treatments.[25] Yet, neonic seed treatments are on almost all corn seeds, most soybean seeds, and most other grain and oilseed crops in the U.S.[26]

In summary, while their benefits are negligible, seed treatments contribute significantly to water and soil contamination.[27] Thus, cancelling these uses is expected to deliver large environmental health benefits from pollution reduction, with negligible economic impact on growers.

Federal failures: *EPA removed FQPA 10X safety factor; didn't evaluate cumulative risks*

EPA has failed to apply important child-protective provisions of the FQPA to neonics. Based on the results of industry-sponsored rodent tests, the EPA does not consider children to be uniquely sensitive, so it has not applied the FQPA 10X safety factor to any of the neonicotinoid risk assessments. For imidacloprid, EPA itself has acknowledged "evidence of increased qualitative susceptibility in the rat developmental neurotoxicity study," but then dismissed the concern with the unproved supposition that the doses used in the study would be higher than those selected for regulatory purposes.[28] In doing so, EPA failed to understand that animal toxicity testing studies are commonly designed using elevated doses, with the intention that regulators will derive a dose-response for lower doses. Moreover, as we stated earlier, it is scientifically reasonable and prudent to presume that there may be no safe level of exposure during early life development for neurotoxic agents.

EPA does not currently consider the neonicotinoids as a cumulative assessment group (CAG) under the FQPA because it has not determined that they share a "common mechanism of toxicity."[29] This means that EPA will not determine the risk from potential real-world cumulative exposure to all five EPA-approved neonicotinoid chemicals, but will instead parse the risks to each neonic as if people were exposed to that one alone. This will result in much higher exposure limits and will almost certainly fail to protect vulnerable populations, including pregnant women and children.

Conclusion

Neonics are widely disseminated in the environment and human exposure is ubiquitous from food and drinking water. With many known instances of acute poisoning with neonics and emerging research linking chronic exposure with a host of negative health outcomes, there is ample reason to be concerned about such widespread neonic exposure.

We urge the EPA to:

- cancel seed treatment uses immediately;
- include the 10X safety factor as required by the FQPA to protect sensitive populations including pregnant women, infants and children; and
- address the cumulative impacts of the neonics as a group, as required by the FQPA.

We ask that EPA address the deficiencies in its human health assessment and fully analyze the risks posed by neonics before permitting continued use of these neurotoxins across millions of acres of lawns, gardens, and agricultural fields across the nation.

Respectfully,

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Supported by the following:

Please note that academic affiliation provided for informational purposes only and does not imply institutional endorsement.

Redacted

Redacted

Redacted

Redacted

CC:
Richard Keigwin, Director, Office of Pesticide Programs, EPA
Dana Vogel, Director of Health Effects Division, Office of Pesticide Programs, EPA
Ricardo Jones, Team Leader, Office of Pesticide Programs, EPA
Margaret Hathaway, Senior Regulatory Specialist, Office of Pesticide Programs, EPA
Steven Snyderman, Environmental Protection Specialist, Office of Pesticide Programs, EPA

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